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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/816,409	04/01/2004	Jose Tellado	Teranetics-1003-1	4973
7590		03/08/2007	EXAMINER	
Brian R. Short			AHN, SAM K	
Teranetics Patent Dept.				
P.O. Box 641867			ART UNIT	
San Jose, CA 95164-1867			PAPER NUMBER	
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SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE		
3 MONTHS	03/08/2007	PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

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Office Action Summary	Application No. 10/816,409	Applicant(s) TELLADO ET AL.	
	Examiner Sam K. Ahn	Art Unit 2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 December 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 4-52 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-8,15 and 18-52 is/are rejected.
- 7) ☒ Claim(s) 9-14,16 and 17 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 December 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, see p.15, filed 12/01/06, with respect to the rejection(s) of claim(s) 1,3-5,18-37 and 40-52 under 102 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Shattil US 7,092,352 B2.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 6,7,38 and 39 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 6 and 7, lines 2 and 3, respectively recite "the coupling". There is insufficient antecedent basis for this limitation in the claim. It is unclear and indefinite from the claim of what the "coupling" is, and how the "coupling" is configured with the rest of the recited elements. Therefore, the claim fails to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Same rejection applies to claims 38 and 39.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1,2,4,5,8,15,18-23,32-37,40,41 and 49-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shattil US 7,092,352 B2.

Regarding claim 1, Shattil teaches a transceiver (note title and col.3, lines 39-41) comprising: a receiver (see Fig.6) receiving a plurality of digital signal streams (plurality of streams to 605.1 – 605.M), at least one of the plurality of digital signal streams being coupled to another of the plurality of digital signal streams (wherein the streams are coupled via W&S, 607, further illustrated in 503 in Fig.5B); a domain transformer (606.1 in Fig.6) for transforming sub-blocks of each at least one of the plurality of the digital signal streams from an original domain into a lower complexity domain (transforming from time to frequency domain), wherein each sub-block includes less digital signal stream samples than a block (the elements 606.1 – 606.M also generating decomposed signals, note col.10, lines 23-28 through a filter bank, wherein a filter from the filter bank is taught in Fig.7B receiving samples and generating subsamples, note col.11, lines 8-11); a processor for joint processing of the transformed sub-blocks of the plurality of digital signal streams (607 in Fig.6 processing all the plurality of subsamples from 606.1-606.M), each of the joint processed digital signal stream sub-blocks being influenced by other digital signal streams sub-blocks (as

illustrated in Fig.5B, the combination of all the plurality of subsamples are used, output of 503, to determine the performance measurement 506 and generate corresponding weights 509, thus, subsamples from each of the streams are influenced by another subsamples); and an inverse transformer for inverse transforming the joint processed signal streams sub-blocks back to the original domain (505 in Fig.5B, wherein output of the element is back to time domain). And although Shattil does not explicitly teach wherein a block includes enough samples to exceed joint filter time sample spans of the plurality of digital signal streams, Shattil teaches wherein the samples are subsampled by a factor of two (note col.11, lines 8-12), hence one skilled in the art would recognize that the initial number of samples input to the filter in Fig.7B had enough samples that exceed a criteria. In this case, the limitation to exceed joint filter time sample spans of the plurality of digital signal samples is interpreted as the criteria. One skilled in the art would further recognize that reducing the number of samples reduce computation load by a processor. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to recognize that the system of Shattil produces subsamples from a sample or a block that includes enough samples to exceed joint filter time sample spans of the plurality of digital signal streams, for the purpose of reducing computation load by reducing the number of samples for further processing.

Regarding claim 2, Shattil teaches all subject matter claimed, as applied to claim 1. And although Shattil does not explicitly teach wherein a block includes enough digital signal stream samples that transforming and processing blocks of the plurality of digital signal streams does not introduce distortion, Shattil does teach transforming and processing of the blocks, as previously explained. And further Shattil teaches a cancellation circuit (note col.2, lines 61-63), hence one skilled in the art would recognize that the circuit cancels distortion or noise, and not introduce a new distortion. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to recognize that the system of Shattil does not introduce new distortion for the purpose of properly executing the primary function of the cancellation circuit (note col.2, lines 61-63).

Regarding claim 4, Shattil further teaches wherein same size sub-blocks are used for transmit and receive joint processing (see Fig.3B and 4B wherein the transmit and receive processing are performed in equivalent size sub-blocks).

Regarding claim 5, Shattil further teaches wherein the domain transformer uses common sub-block transformers for both transmit and receive joint processing (see Fig.3B and 4B wherein for transmit and receive processing of converting from frequency to time and vice versa using common transformers, 310 and 410).

Regarding claim 8, Shattil further teaches wherein the joint processing includes multiplying each of the digital signal streams sub-blocks with sub-block processing matrices (see 207 in Fig.2 and note col.8, lines 21-32).

Regarding claim 15, Shattil further teaches wherein the plurality of digital signal streams comprise signals for transmission by the transceiver $S_m'(t)$ in Fig.8B.

Regarding claim 18, Shattil further teaches wherein at least one digital signal stream includes time domain processing (605.1 in Fig.6 receiving signals in time domain and converted to frequency domain after 606.1).

Regarding claim 19, Shattil further teaches wherein the joint processing of the transformed signal streams is performed on signal streams to be transmitted (see Fig.8B performing joint processing 810 in transmitting and receiving signals, note col.4, lines 49-50).

Regarding claim 20, Shattil further teaches wherein the joint processing of the transformed signal streams is performed on signal streams to be transmitted (see Fig.8B performing joint processing 810 in transmitting and receiving signals, note col.4, lines 49-50).

Regarding claim 21, Shattil further teaches including N digital signal streams (Rx each processing signal streams having N or M), and M joint processed signal streams (producing M or m streams, output by 607).

Regarding claim 22, Shattil further teaches including N digital signal streams (Rx each processing signal streams having N or M), and a single joint processed signal stream (producing $s'(m')$ stream, output by 608).

Regarding claim 23, Shattil further teaches wherein the transform block additionally transforms filtering coefficients (the weights or coefficients from 509 applied to the signals 502 are transformed by the decoder 505 to be in time domain).

Regarding claim 32, the claim is rejected as applied to claim 1 with similar scope.

Regarding claim 33, the claim is rejected as applied to claim 1 with similar scope. Shattil further teaches the limitation of an analog front end for transmitting the joint processed signal streams $S_m'(t)$ in Fig.8B.

Regarding claim 34, the claim is rejected as applied to claim 1 with similar scope.

Regarding claim 35, the claim is rejected as applied to claim 1 with similar scope.

Regarding claim 36, the claim is rejected as applied to claim 4 with similar scope.

Regarding claim 37, the claim is rejected as applied to claim 5 with similar scope.

Regarding claim 40, the claim is rejected as applied to claim 23 with similar scope.

Regarding claim 41, Shattil further teaches wherein a maximal amount of Ethernet signal interference minimization processing is performed in the lower complexity domain (wherein the weight to minimize interference is computed in frequency domain (see Fig.5B).

Regarding claim 49, the claim is rejected as applied to claim 1 with similar scope. The recitation in the preamble is not given patentable weight since the recitation recites the intended use of a structure and the body of claim does not depend on the preamble for completeness and the bodily limitations are able to stand alone.

Regarding claim 50, the claim is rejected as applied to claim 1 with similar scope. The recitation in the preamble is not given patentable weight since the recitation recites the intended use of a structure and the body of claim does not depend on the preamble for completeness and the bodily limitations are able to stand alone.

Regarding claim 51, the claim is rejected as applied to claim 1 with similar scope. The recitation in the preamble is not given patentable weight since the recitation recites the intended use of a structure and the body of claim does not depend on the preamble for completeness and the bodily limitations are able to stand alone.

Regarding claim 52, the claim is rejected as applied to claim 1 with similar scope. The recitation in the preamble is not given patentable weight since the recitation recites the intended use of a structure and the body of claim does not depend on the preamble for completeness and the bodily limitations are able to stand alone.

4. Claims 24-31 and 42-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shattil US 7,092,352 B2 in view of Jones et al. US 2004/0213146 (Jones, cited previously).

Regarding claim 24, Shattil further teaches wherein the transform block additionally transforms filtering coefficients (the weights or coefficients from 509 applied to the signals 502 are transformed by the decoder 505 to be in time domain) to reduce or cancel interference (note col.6, lines 60-64).

However, Shattil does not teach wherein the digital signal streams are of an Ethernet digital signal streams.

Jones also teaches transforming block with filtering coefficients in order to reduce interference to an Ethernet digital signal streams (see 320 in Fig.3 and note

paragraphs 0003, 0005 and 0011). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to incorporate the teaching of interference canceller of Shattil or the interference canceller of Jones in an Ethernet environment for the purpose of increasing the flexibility of the overall usage of the system.

Regarding claim 25, Shattil further teaches wherein the filtering coefficients include a transfer domain representation of a time domain filter (wherein the weights generated by 509 in Fig.5B is applied in a frequency domain, one skilled in the art would recognize that the weights can also be applied in time domain by transforming and applying the weights to time domain by frequency to time converters).

Regarding claim 26, the claim is rejected as applied to claim 24 with similar scope.

Regarding claim 27, Jones further teaches wherein the joint processing provides reduction of near end cross talk (note paragraph 0004).

Regarding claim 28, Jones further teaches wherein the joint processing provides reduction of alien near end cross talk (note paragraph 0004).

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Regarding claim 29, Jones further teaches wherein the joint processing provides reduction of far end cross talk (note paragraph 0005).

Regarding claim 30, Jones further teaches wherein the joint processing provides reduction of echo signal interference (note paragraph 0004).

Regarding claim 31, Shattil further teaches wherein the joint processing provides reduction of inter-symbol interference (note col.3, lines 64-66, wherein the signals experiencing inter-symbol interference is reduced by the cancellation system).

Regarding claim 42, the claim is rejected as applied to claim 24 with similar scope.

Regarding claim 43, the claim is rejected as applied to claim 26 with similar scope.

Regarding claim 44, the claim is rejected as applied to claim 27 with similar scope.

Regarding claim 45, the claim is rejected as applied to claim 28 with similar scope.

Regarding claim 46, the claim is rejected as applied to claim 29 with similar scope.

Regarding claim 47, the claim is rejected as applied to claim 31 with similar scope.

Regarding claim 48, the claim is rejected as applied to claim 30 with similar scope.

Allowable Subject Matter

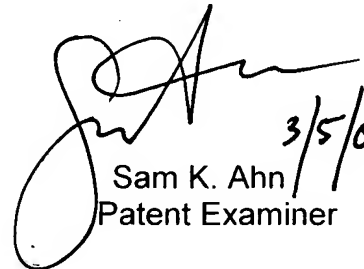
5. Claims 9-14, 16 and 17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
6. The following is a statement of reasons for the indication of allowable subject matter: present application discloses a transceiver receiving plurality of signal streams, converting to frequency domain, jointly processing the converted plurality of signal streams and converting back to time domain. Prior art teaches all subject matter claimed. However, prior art does not explicitly teach the further limitation of selecting diagonal elements or off-diagonal elements of the sub-block processing matrices to reduce inter-symbol interference or crosstalk of the digital signal streams.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sam Ahn whose telephone number is (571) 272-3044. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on (571) 272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


3/5/07
Sam K. Ahn
Patent Examiner